



Atty. Docket No. 099505-051061

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Jabar, et al.	Examiner:	Grunberg, Anne Marie
Serial No.:	10/056,803	Group:	1661
Filed:	January 24, 2002		
For:	METHOD OF INCREASING CROP YIELD		

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

I, Robert D. Smith, hereby declare as follows:

1. I am a resident of the United States of America at 26470 Tierra Vista Lane, Marina CA 93908.
2. I am currently employed as Vice President and Director of Research and Development of Global Protein Products Inc, Marina, CA, the assignee of the above-identified application. A copy of my Curriculum Vitae is attached hereto as Appendix I.
3. I have significant experience in plant molecular biology and plant biochemistry, dating from 1982, and have a Ph.D. in Molecular Genetics and Cell Biology awarded by the University of Chicago.
4. I am aware of application invention entitled "Method of Increasing Crop Yield" U.S. Serial No. 10/056,803; Inventors, Anthony Jabar and G. Noel Currie.
5. I am familiar with the art including McArdle (U.S. Patent 5,747,416), Redenbaugh (U.S. Patent 4,779,376) and Stubbs et al. (U.S. Patent 5,622,741), which I am aware have been cited by the Examiner.

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6. Subjecting potato pieces to steam or hot water at temperatures between 145°F and 212°F (63°C to 100°C) for about 5 to 30 minutes, i.e. blanching, inactivates enzymes that are necessary and required for growth.
7. The potato pieces noted in paragraph 6 are incapable of growth.
8. I declare, as one skilled in the art, that in reading both McArdle et al. (U.S. Patent 5,747,416) and Redenbaugh et al. (U.S. Patent 4,779,376) one would not arrive at the Applicant's invention. Nor does McArdle teach use of a peptide-polysaccharide complex alone.
9. McArdle teaches a protein-polysaccharide complex used as a carrier for agronomically beneficial agents such as insecticides. McArdle *does not* teach a seed coating.
10. Redenbaugh teaches a coating of a water saturated hydrogel, See column 3 lines 64-68 and column 17, (claim 1, lines 38-39) that contains free water, which may be used by the seed to initiate the process of germination at the time of delivery (column 4, lines 54-56). This is in contrast to the crop seed coating of the Applicant's invention that is dry and keeps out moisture.
11. Given the purpose of Redenbaugh's seed coating, i.e., keep water in contact with the seed to initiate germination, there is no reason that one would be motivated to combine the teachings of Redenbaugh with McArdle.
12. Furthermore, neither the McArdle patent nor the Redenbaugh patent teach or suggest the unexpected results of the Applicants coating, which show a significant increased rate of emergence and seed piece integrity. See Example 1 of the Application which shows a greater than 20% increase in emergence and greater than a 50% increase in seed integrity.
13. In addition, Applicants show that there is a 21.8% increase in yield when potato seed pieces are coated with the Zein/polysaccharide complex, as compared to treatment of

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seeds with a conventional fungicide. This 21.8% increase in yield resulted in the production of an additional 650,000 pounds of potatoes for a 100 acre plot.

14. The surprising crop benefits seen by the Applicant are not taught and would not be suggested by McArdle or Redenbaugh.

I further declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date

1/19/06

Robert B. Smith

Robert D. Smith, Ph.D.

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Professional Experience

Vive President and Director of Research & Development (2003 - present) Global Protein Products Inc.
Marina, CA

- Developed R&D program for AgBiotech company
- Product support for lead products
- Responsible for overseeing intellectual property
- Supervised research activities in Maine and California offices
- Coordinate research collaborations with major Ag produce companies

Consultant (2001 –2002) Sentia Consulting Services, LLP, Falmouth, ME

- Scientific consulting services to the life science and agrochemical industries
- Provide review of IP estate
- Strategic planning for R&D projects
- Strategic Planning for IP development
- Initiate contacts and facilitate deals with strategic partners, industry and academic collaborators and contract services

Director of Research (1999 – 2001) PhycoGen Inc., Falmouth, ME

- Established and directed R&D program for start-up biotechnology company
 - Implemented small molecule discovery platform for novel anti-microbial compounds
 - Supervised R&D group of 6 PhD and MS scientists
 - Coordinated extramural contracts with Universities and service providers
 - Coordinated technical product evaluations with major agricultural, industrial and consumer product companies
 - *Ex-officio* member of the PhycoGen Scientific Advisory Board
 - Reported to CSO and CEO
 - Developed new screening technologies for drug discovery
 - Techniques used in program: Molecular biology (library construction, cloning, expression of recombinant proteins and enzyme analyses), combinatorial chemistry, small molecule screening, whole plant screens, microbial screens (gram positive and gram negative bacteria, fungal pathogens), HPLC, GC, MS, NMR, IR, QSAR
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Project Leader (1997 - 1999) DeKalb Genetics (Monsanto), Mystic, CT

- Responsible for strategic planning and implementation of the 'high oil' and 'low phytate' bioengineering programs for major crops in Monsanto and as part of Renessen, a joint venture between Monsanto and Cargill
- Coordinated planning, design and production of transgenic vector constructs for integration into maize and soybeans
- Oversaw screening of primary transformants and selection of lead transgenic events for further evaluation
- Member of the Mystic Management Council
- Member of the Institutional Biosafety Committee for Recombinant DNA Research
- Techniques used in program: molecular biology (vector construction, library construction and screening, cloning, expression of recombinant proteins, enzyme assays), RFLP mapping, molecular characterization of transgenic events, analysis of grain quality (HPLC, GC, FTIR, protein gels)

Research Assistant Professor (1995 - 1997) Rutgers Univ., New Brunswick, NJ.

- Conducted research program focused on the molecular/biochemical uptake, transport and accumulation of toxic heavy metals in plants
- Studied uptake and bioconversion of nickel and arsenic
- Characterized histidine biosynthetic genes from nickel hyperaccumulating plants
- Developed phytoremediation technologies for clean-up of polluted environments
- Obtained about \$1 million in research grants from New Jersey Commission on Science and Technology and from the Department of Energy
- Research consultant for NJ-based biotechnology company (Phytotech Inc.)
- Techniques used in program: molecular biology (cloning, library constructs, screening and gene expression), metal analysis (AA, radioisotopes, EXAF), plant culture

Postdoctoral Fellow, (1990 - 1995). Dept. Biological Sciences, Univ. of Missouri-Columbia.

- Initiated project examining role of phosphoprotein phosphatases in plants
- Cloned and characterized major family of type-1 protein phosphatases in Arabidopsis
- Characterized the functional complementation of yeast protein phosphatases using plant genes
- Examined the structure-function relations of protein phosphatases
- Collaborated on the cloning and characterization of plant receptor protein kinases and associated phosphatases
- Awarded grants by the University of Missouri and by the National Institute of Health (NIH Postdoctoral Fellowship) to conduct this project

Education

Ph.D. 1989, The University of Chicago, Molecular Genetics and Cell Biology (awarded NIH pre-doctoral fellowship)

B.A. 1982, The College, University of Chicago, Biology (honors)

Professional Information

- Inventor on 1 issued patent and 2 pending patents
- Professional memberships in the American Society for the Advancement of Science, Society for Experimental Biology and American Society of Plant Physiologists
- Fluent in French and Spanish
- Computer proficient in: MS Word, MS Excel, MS Project, MS PowerPoint, MS Access, ChemDraw, Canvas, and Photoshop

Publications

- Stanley MS, Callow ME, Perry R, Alberte RS, Smith RD and Callow JA. (2002). Inhibition of Fungal Spore Adhesion by Zosteric Acid as the Basis for a Novel, Non-toxic Crop Protection Technology. *Phytopathology* (In Press)
- Pickering IJ, Prince RC, Smith RD, George GN, Salt DE. (2000) Reduction and coordination of arsenic by Indian mustard *Plant Physiol* 122:1171-1177
- Qing L, Li J, Smith RD, and Walker JC. (1998). Molecular cloning and chromosomal mapping of type one serine/threonine protein phosphatases in *Arabidopsis thaliana*. *Plant Mol. Biol.* 37:471-481, 1998
- Salt DE, Pickering IJ, Prince RC, Gleba D, Dushenkov S, Smith RD and Raskin I. (1997) Metal accumulation by aquacultured seedlings of indian mustard. *Env. Sci. Technol.* 31: 1636-1644
- Raskin I, Smith RD, and Salt DE. (1997). Phytoremediation of metals: using plants to remove pollutants from the environment. *Current Opinion in Biotechnology.* 8:221-226
- Walker JC, Stone J, Collinge M, Horn M, Braun D and Smith RD. (1995). Receptor-like protein kinases. Proceedings of the "Protein Phosphorylation in Plants" Meeting, Bristol, England. 17:225-238
- Smith RD, Qing L, Cannon JF, and Walker JC. (1995). Type-1 and type-2C protein phosphatases of higher plants. *Adv. Prot. Phosphatases.* 9:105-120
- Stone J, Collinge MA, Smith RD, Horn MA, and Walker JC. (1994). Interaction of a protein phosphatase with an *Arabidopsis* serine-threonine receptor kinase. *Science*, 226:793- 7
- Smith RD, Wilson JE, Walker JC and Baskin TI. (1994). Protein phosphatase inhibitors block root hair growth and alter cortical cell shape of *Arabidopsis* roots. *Planta*, 194:516-524
- Smith RD and Walker JC. (1993). Expression of multiple type 1 protein phosphatases in *Arabidopsis thaliana*. *Plant Mol. Biol.* 21:307-316
- Smith RD and Walker JC. (1991). Isolation and expression of a maize type 1 protein phosphatase. *Plant Physiol.* 97:677-683
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Smith RD, Pregnall AM and Alberte RS. (1988). Effects of anaerobiosis on root metabolism of *Zostera marina* (eelgrass): implications for survival in reducing sediments. *Mar. Biol.* 98:131-141

Zimmerman RC, Smith RD and Alberte RS. (1987). Is growth of eelgrass nitrogen-limited? A numerical simulation of the effects of light and nitrogen on the growth dynamics of *Zostera marina*. *Mar. Ecol. Prog. Ser.* 41:167-176

Pregnall AM, Smith RD and Alberte RS. (1986). Glutamine synthase activity and free amino acid pools of eelgrass (*Zostera marina*) roots. *J. Exp. Mar. Biol. Ecol.* 106:211-228

Pregnall AM, Smith RD, Kursar TA and Alberte RS. (1984). Metabolic adaptation of *Zostera marina* (eelgrass) to diurnal periods of root anoxia. *Mar. Biol.* 83: 141-147

Smith RD, Dennison WC and Alberte RS. (1984). Role of seagrass photosynthesis in root aerobic processes. *Plant. Physiol.* 74:1055-1058

Reviews and Book Chapters:

Wentzel W, Salt DE, Smith RD, and Adriano DC. (1999). Phytoremediation: A plant-microbe-based remediation system. In: *Bioremediation of Contaminated Soils*. DC Adriano, J-M Bollag et al., (eds).

Chapter 18, CRC Press LLC, Boca Raton, FL, USA

Salt DE, Kato N, Kramer U, Smith RD, and Raskin I. (1999) The role of root exudates in nickel hyperaccumulation and tolerance in accumulator and non-accumulator species of *Thlaspi*. In: *Phytoremediation of Contaminated Soil and Water*, Terry N, and Bafuelos aS (eds.), Chapter 10, pp 191- 202. CRC Press LLC, Boca Raton, FL, USA

Raskin I, Salt DE, and Smith RD. (1998). Phytoremediation. *Annual Review of Plant Physiology and Plant Molecular Biology.* 49:643-668

Smith RD, and Walker JC. (1996). Plant Protein Phosphatases. *Annual Review of Plant Physiology and Plant Molecular Biology.* 47:101-125

Patents:

Alberte RS and Smith RD. Transgenic Plants Incorporating Traits of *Zostera marina*. 6,841,718

Patent Applications:

Alberte RS and Smith RD (Filed April 3, 2001) Generation of Combinatorial Synthetic Libraries and Screening for Novel Proadhesins and Nonadhesins. US20020052003

Smith RD and Jabar Jr. (Filed October 11, 2002) A Method for Treating Crops to Enhance Plant Performance US 60/417,860
